

PATENT SPECIFICATION



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PROVISIONAL SPECIFICATION

Apparatus for Filling and/or Applying Closures to Bottles or other Containers

We, HERBERT CYRIL TAYLOR, a British Subject of 281, Lonsdale Road, Barnes, London, S.W.13, and U. D. ENGINEERING COMPANY LIMITED, a British Company, 5 of Abbey Works, Cumberland Avenue, Park Royal, London, N.W.10, do hereby declare the nature of this invention to be as follows:—

This invention relates to apparatus for filling and/or applying closures to bottles or other containers and is concerned with such apparatus of the type in which a rotatable member has one or more operating devices offset from the axis of rotation, and in which means is provided for moving the bottles or other containers in company with the operating devices through at least a part of their circular path. In the case of a filling apparatus the rotatable member aforesaid comprises a reservoir for the substance to be supplied to the bottles or other containers, and each of the operating devices comprises a nozzle communicating with the reservoir and having a valve which is opened by engagement of a bottle with the nozzle. In the case of apparatus for applying closures to bottles or other containers, each operating device 25 consists of a capping element for applying a cap to a bottle on engagement of the bottle with the capping element.

In this known type of apparatus it is convenient to employ a travelling conveyor for feeding bottles to and from the filling or capping apparatus, together with star or scalloped wheels for spacing the bottles or other containers and transferring them to and from the filling or capping apparatus. In some cases both filling and capping apparatus are employed, and in this case the bottles or other containers may be transferred directly by 40 means of a transfer wheel from the filling apparatus to the capping apparatus. Usually, the filling and/or capping apparatus, the transfer wheels and the conveyor are driven through gear-trains housed in the base of the machine from a single prime-mover, and it is the primary object of the present invention to avoid the need for such gear-trains which

may be of a complicated and expensive nature.

According to the present invention there is provided an apparatus of the aforesaid type comprising a chain or other endless flexible conveyor for the bottles or the like, which conveyor is arranged in driving engagement with the rotatable member of the apparatus, so that the drive is transmitted from one to the other without the use of an independent gear-train. Conveniently, the conveyor is also arranged in driving engagement with transfer or spacing wheels, and it will be understood that the prime-mover may be coupled to any one of the rotating parts of the apparatus, which thus has a driving connection with the conveyor.

According to a further feature of the invention, the conveyor is arranged to carry the bottles or other containers for their complete travel from a feeding station through the filling and/or capping apparatus to a discharge station.

In one form, the invention is applied to apparatus for filling and/or applying closures to bottles or other containers in which the usual vertically moving pedestals are dispensed with, and the filling nozzles or capping elements, as the case may be, are lowered for engagement with the bottles, and retracted again after the filling and/or capping operation, the bottles moving only in a lateral path during such operation. According to the present invention, in apparatus adapted to be hand-fed, there is provided an endless chain conveyor arranged to move as a platform for carrying bottles from a feeding station successively through filling and capping apparatus and then to a discharge station. From the feeding station the chain passes on to a rotating supporting platform and moves round through an arc of a circle while carried on this platform between fixed guides. This rotating platform is conveniently provided with means for the displacement of its axis of rotation in order to control the tension of the conveyor.

The chain is then guided by fixed

guides on to another rotating platform and moves round an arc of a circle while carried on this platform. Above this rotary platform there is mounted a selector wheel rotating therewith and formed with recesses to receive successive bottles and thus space them a predetermined distance apart on the conveyor. From this selector wheel the chain conveyor is guided on to another rotary platform forming part of a filling apparatus, this platform moving in company with a rotatably mounted reservoir for the substance to be filled into the bottles and having depending delivery nozzles offset from the axis of rotation. The selector wheel aforesaid is so arranged as to position the bottles on the conveyor in such a manner that they come into register with successive nozzles of the filling apparatus. During the movement of the conveyor on the platform of the filling apparatus the bottles are filled from the nozzles. At the position of the rotatable platform corresponding to the completion of the filling operation the chain conveyor is guided on to another rotary platform similar to that employed for the selector wheel to transfer the conveyor to a rotatable platform of a capping apparatus comprising a plurality of capping devices mounted on a rotary head rotating in company with the platform of the capping apparatus. The transfer platform is so arranged that the bottles delivered from the filling apparatus are fed to the capping apparatus successively into register with the capping devices thereon, and these capping devices are operated to apply closures to the bottles.

At that position of the platform of the capping apparatus corresponding to the completion of the capping operation the chain conveyor is guided off the platform thereof on to another support which is straight and extends between the capping apparatus and the tensioning device aforesaid, a suitable deflecting guide being employed to deflect the bottles from the conveyor on to a discharge table.

In a convenient arrangement, the conveyor is arranged to pass round the outer

sides of the chain tensioning device and capping apparatus, around the inner sides of the selector and transfer platforms, and again round the outer side of the filling apparatus, the several components being arranged in somewhat triangular formation with the straight run of the conveyor at the base of the triangle and with the filling apparatus at the apex.

In another form of the apparatus the conveyor, instead of passing directly from the discharge station to the feeding station, separated by the deflector aforesaid, it is arranged to deliver the bottles to a discharge station and is then provided with a return-run back to an independent feeding station. In this case, the chain tensioning means referred to may be dispensed with and an alternative tensioning means may be provided in engagement with this return-run of the conveyor.

It is essential for the purposes of this invention that the chain conveyor shall be flexible in a lateral plane. The aforesaid return-run of the conveyor may be either in the same plane as the rest of the conveyor, or may be accommodated at a lower plane beneath the main parts of the apparatus by being passed over guides, such as rollers turning about horizontal axes. In the latter case, the chain conveyor must be additionally flexible in a vertical plane.

In a modification, the conveyor, instead of constituting the platform on which the bottles are supported during the filling and/or capping operations may constitute a driving connection for an otherwise independent platform, in which case means is provided for automatically transferring the bottles from the conveyor to the platform of the filling and/or capping apparatus, and back again to the conveyor after the filling or capping operation has been completed.

Dated this 4th day of March, 1938.

BOULT, WADE & TENNANT,
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COMPLETE SPECIFICATION

Apparatus for Filling and/or Applying Closures to Bottles or other Containers

We, HERBERT CYRIL TAYLOR, a British Subject of 281, Lonsdale Road, Barnes, London, S.W.13, and U. D. ENGINEERING COMPANY LIMITED, a British Company, of Abbey Works, Cumberland Avenue, Park Royal, London, N.W.10, do hereby

declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

This invention relates to apparatus for

filling and/or applying closures to bottles or other containers and is concerned with such apparatus of the type in which a rotatable member has one or 5 more operating devices offset from the axis of rotation, and in which means is provided for moving the bottles or other containers in company with the operating devices through a part of their circular path. In the case of a filling apparatus the rotatable member aforesaid comprises a reservoir for the substance to be supplied to the bottles or other containers, and each of the operating devices 10 15 comprises a nozzle communicating with the reservoir and having a valve which is opened by engagement of a bottle with the nozzle. In the case of apparatus for applying closures to bottles or other containers, each operating device consists of a capping element for applying a cap to 20 25 a bottle on engagement of the bottle with the capping element.

In this known type of apparatus it is convenient to employ a travelling conveyor for feeding bottles to and from the filling or capping apparatus, together with star or scalloped wheels for spacing the bottles or other containers and transferring them to and from the filling or 30 35 capping apparatus. In some cases both filling and capping apparatus are employed, and in this case the bottles or other containers may be transferred directly by means of a transfer wheel from the filling apparatus to the capping apparatus. Usually, the filling and/or capping apparatus, the transfer wheels and the conveyor are driven through gear-trains housed in the base of the machine 40 45 from a single prime-mover, and it is the primary object of the present invention to avoid the need for such gear-trains which may be of a complicated and expensive nature.

According to the present invention there is provided an apparatus of the aforesaid type comprising a chain or other endless flexible conveyor for the containers, which conveyor is arranged in driving engagement with the rotatable member for transmitting the drive from one to the other. A further feature of the invention consists in the provision of a 50 55 spacing member in driving connection with the conveyor for spacing the containers thereon so as to register with the operating devices.

According to one preferred form of the invention there is provided a drive member rotating coaxially with the rotatable member and engaged at its periphery by the conveyor to bring the containers on the conveyor into register with the path of 60 65 the operating devices carried by the

rotatable member and to support them for the filling or capping operation. The spacing member aforesaid is conveniently rotatable with a coaxial drive member engaged at its periphery by the conveyor 70 and constituting a support for the conveyor in passing to and from the said rotatable member of the apparatus. Preferably, the flexible conveyor has a return run in a plane different from that in which it moves in company with the rotatable member carrying the operating devices. The return run of the conveyor may thus be housed in the base of the machine. 75 80

One specific embodiment of the invention is illustrated by way of example in the accompanying drawings in which:—

Figure 1 is a diagrammatic plan view of a combined filling and capping apparatus for bottles, 85

Figure 2 is a part-sectional elevation of the filling apparatus, and

Figure 3 is a detail view on an enlarged scale. 90

In the usual construction of apparatus for filling and/or capping bottles of the type to which this invention relates the bottles are delivered by the conveyor to a scalloped wheel for spacing the bottles and transferring them on to pedestals mounted beneath the operating devices and rotatable therewith. These pedestals are raised and lowered hydraulically or mechanically to bring the bottles into engagement with the operating devices for the filling and/or capping operation. 95 100

Although the invention is applicable to this known form of apparatus the preferred application of the invention illustrated in the accompanying drawings is to apparatus for filling and/or applying closures to bottles or other containers of another known form in which the operating devices consisting of filling nozzles or 105 110 capping elements, as the case may be, are lowered for engagement with the bottles and are retracted again after the filling and/or capping operation, the bottles moving only in a lateral path during such 115 operation.

Referring to the drawings, there is provided an endless chain conveyor 22 arranged to move as a platform for carrying the bottles from a feeding station 86 120 successively through filling and capping apparatus and then to a discharge station 87. The filling apparatus comprises a rotary member 15 carrying at its upper part a reservoir 16 for liquid and a plurality of delivery nozzles 17 uniformly spaced apart in a circle about the axis of rotation. The delivery nozzles 17 are operated by means of a stationary cam 21 125 130 engaging with a roller 32 associated with

each delivery nozzle 17. The nozzles are in known manner moved successively by means of the cam into engagement with the bottles brought beneath the nozzles 5 for filling the bottles during a period in which they move round in company with the nozzles. The capping apparatus similarly comprises a rotary member 46 carrying a plurality of capping devices 47 spaced apart in a circle about the axis of rotation and also controlled by means of a stationary cam engaging with a follower associated with each capping device for applying caps to the bottles in known 10 manner during a period in which the bottles move round in company with the capping devices.

The conveyor chain 22 is preferably of the form described in Specification No. 20 505,133 comprising plate-like members 24 carried by alternate links of a simple chain 124.

From the feeding station 86 the chain passes partly around the periphery of a 25 rotary drive member 88 formed with a peripheral groove 89 to receive one side of each alternate link of the chain, that is, the links intermediate those carrying the plate-like members 24. A plurality of 30 radially projecting studs such as that indicated at 90 is provided to engage in the links of the chain to ensure that the drive member 88 moves synchronously with the chain. Above this drive member 35 there is mounted a scalloped wheel 23 rotating therewith and having recesses to receive successive bottles and thus space them a predetermined distance apart on the conveyor.

40 From the drive member 88 the chain conveyor passes directly on to a rotary platform support 13 to which the rotary member 15 of the filling apparatus is coupled for rotation therewith. This platform support is also formed with a peripheral groove 89 and has radially projecting studs 90 as employed for the drive member 88. The chain conveyor 22 lies around a substantial part of the periphery 45 of the platform support 13 and thus drives the support and also the reservoir 16 and delivery nozzles 17 moving with it.

The scalloped wheel 23 is arranged to position the bottles on the conveyor in 55 such manner that they come into register with successive nozzles 17 of the filling apparatus. During the movement of the conveyor with the platform support 13 the delivery nozzles 17 are lowered to the 60 bottles for filling them, as shown in Figure 2, and are then raised again.

The chain conveyor 22 passes from the platform support 13 on to another rotary drive member 91 similar to the drive 65 member 88 and also having a scalloped

wheel 42 rotating therewith which is thus driven by the chain and serves to maintain the required separation of the bottles on the conveyor.

From the drive member 91 the conveyor chain passes directly to a rotary conveyor support 43 of the capping apparatus and similar to the corresponding support 13 of the filling apparatus, the rotary member 46 of the capping apparatus being connected to this conveyor support for rotation therewith. The scalloped wheel 42 ensures that the bottles on the conveyor chain as it passes to the capping apparatus shall be properly in register with the capping devices 17 and during the time the bottles move around the capping apparatus on the conveyor the capping devices are operated to apply caps to the bottles in the known manner.

At the position of the conveyor support 43 corresponding to the completion of the capping operation the chain conveyor passes off the conveyor support 43 and around a drive member 92 of the same form as the drive members 88 and 91 and then passes to the delivery station 87 of the apparatus. From the delivery station 87 the chain conveyor passes over a chain sheaf 93 and by a return run 94 located in the base 11 of the apparatus the chain conveyor passes around a rotary guide member 95 back to the feeding station 86.

It will thus be appreciated that the drive for all the driven parts of the apparatus is effected by means of the chain conveyor 22 and the chain is conveniently driven through the sheaf 93 by means of an electric motor 96 driving by 105 means of a belt 97, one member of a clutch 98, the other member of which is connected to the sheaf 93 through gearing 99. The clutch is arranged to slip under excessive load so as to minimise any 110 damage to the apparatus should it become jammed, for instance, owing to the presence of a bottle of wrong size. Fixed supports such as are indicated at 102 (Figures 2 and 3) may be provided for 115 example by suitably constructing the base of the apparatus to ensure that the plate-like members 24 of the conveyor maintain a horizontal position.

It will be understood that the positions 120 of the filling and capping apparatus as shown in Figure 1 and the positions of the feeding and delivery stations may be changed to suit particular requirements.

In another application of the invention 125 the conveyor chain instead of constituting the platform on which the bottles are supported during the filling and/or capping operations, may constitute only a driving connection for an otherwise 130

independent platform, in which case means such as a scalloped wheel 23 is provided for automatically transferring the bottles from the conveyor to the platform 5 of the filling and/or capping apparatus and back again to the conveyor after the filling or capping operation has been completed. A further application of the invention is to filling and/or capping 10 apparatus in which the bottles are carried on vertically movable pedestals, as hereinbefore described; in this case the conveyor chain is arranged to drive the rotary support for these pedestals and means such 15 as a scalloped wheel 23 is provided also driven by the chain for transferring the bottles from the conveyor on to the pedestals. A similar transferring means is employed for transferring the bottles 20 from the pedestals back to the conveyor or alternatively direct to a capping apparatus when used in conjunction with a filling apparatus.

Having now particularly described and 25 ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Apparatus of the type described for 30 filling and/or applying closures to bottles or other containers, comprising a chain or other endless flexible conveyor for the containers, which conveyor is arranged in driving engagement with the rotatable member for transmitting the drive from one to the other.

2. Apparatus as claimed in claim 1, comprising a spacing member in driving connection with the conveyor for spacing 40 the containers thereon so as to register with the operating devices.

3. Apparatus as claimed in claim 1 or 2, comprising a drive member rotating coaxially with the rotatable member, and engaged at its periphery by the conveyor 45 to bring the containers on the conveyor into register with the path of operating devices carried by the rotatable member to support them for the filling or capping operation. 50

4. Apparatus as claimed in claim 2 or 3, wherein the spacing member is rotatable with a coaxial drive member engaged at its periphery by the conveyor and constituting a support for the conveyor in 55 passing to or from the said rotatable member of the apparatus.

5. Apparatus as claimed in any of the preceding claims, wherein the flexible conveyor has a return run in a 60 plane different from that in which it moves in company with the rotatable member carrying the operating devices.

6. Apparatus for filling and/or applying closures to bottles or other containers as claimed in any of the preceding claims, wherein the conveyor is arranged to carry the containers for their complete travel from a feeding station to a discharge 65 station. 70

7. Apparatus for filling and applying closures to bottles, substantially as herein described with reference to the accompanying drawings. 75

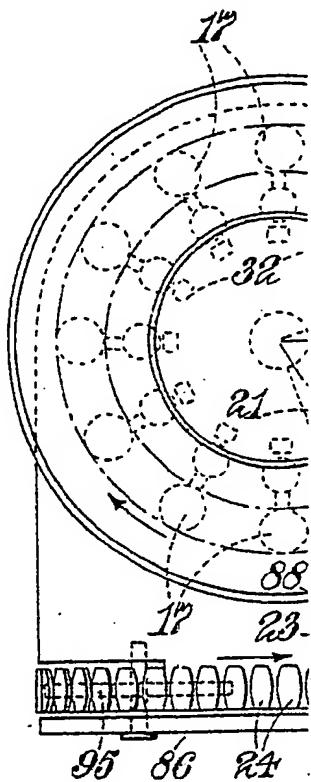
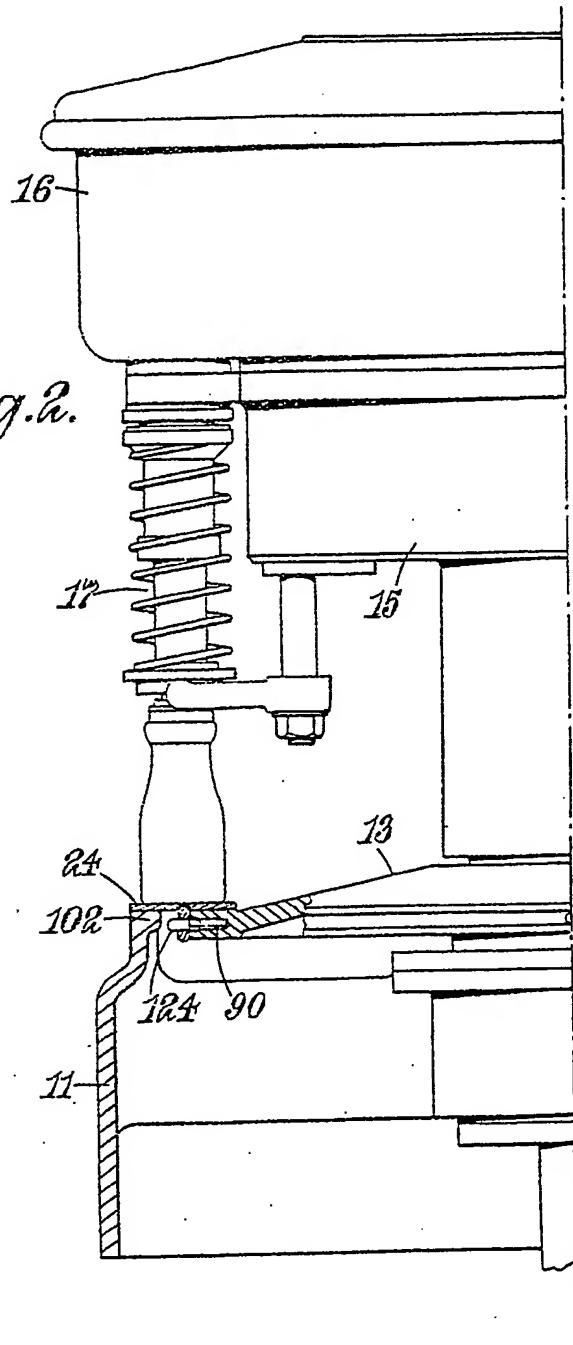
Dated this 21st day of December, 1938.

BOULT, WADE & TENNANT,
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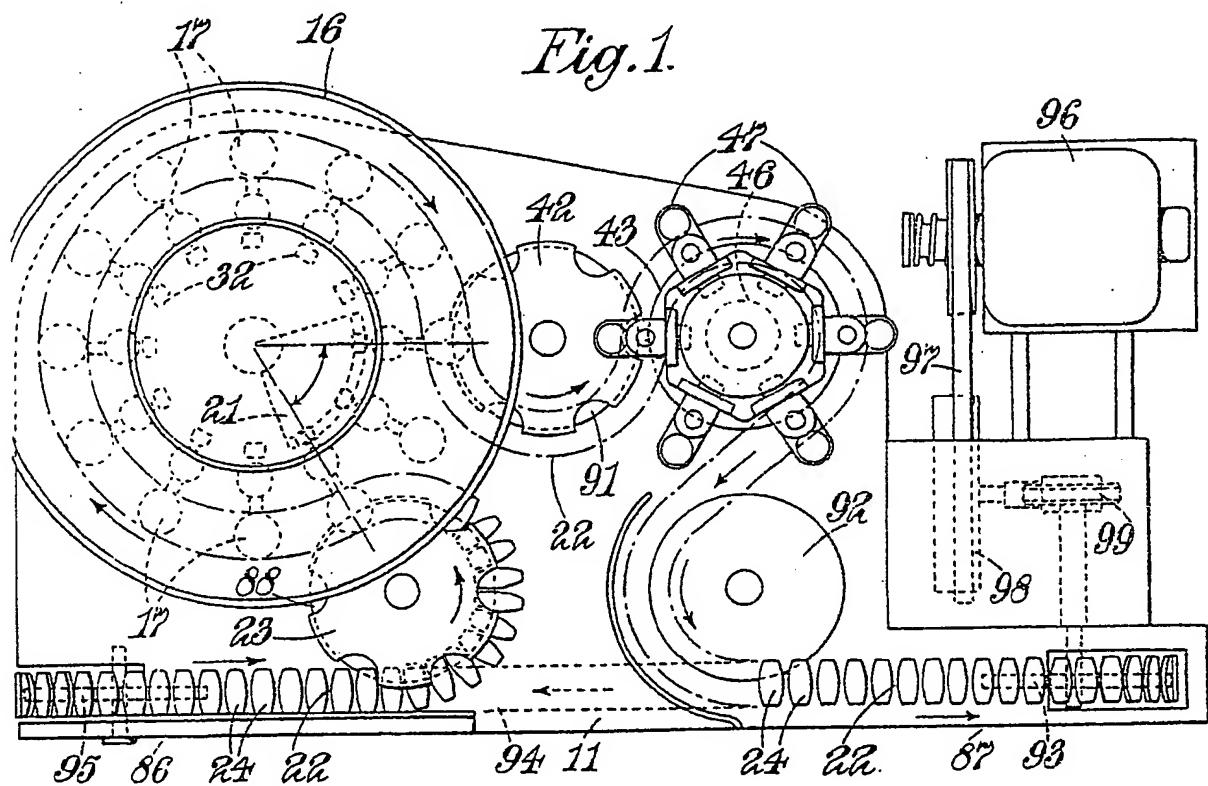
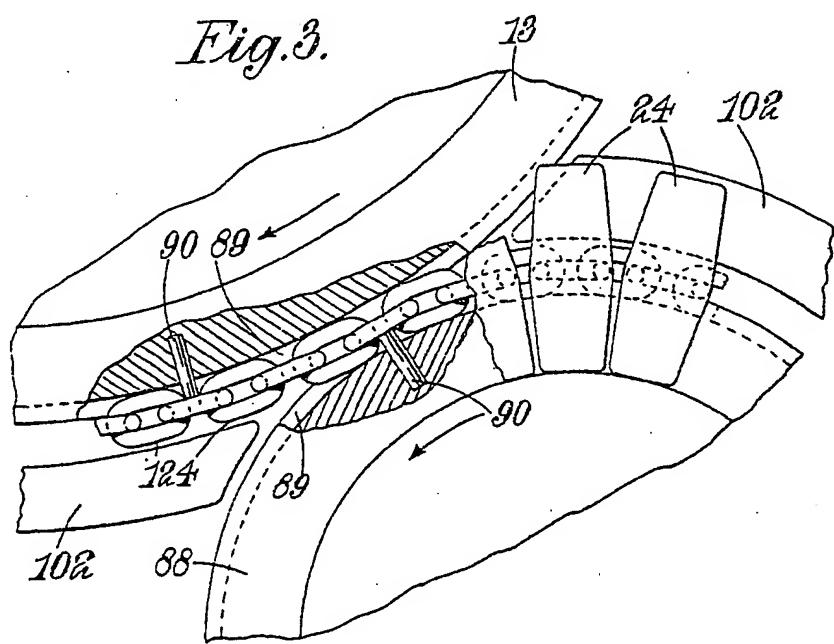
Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1938.

(This Drawing is a reproduction of the Original on a reduced scale.)

Fig. 2.



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*Fig. 3.*

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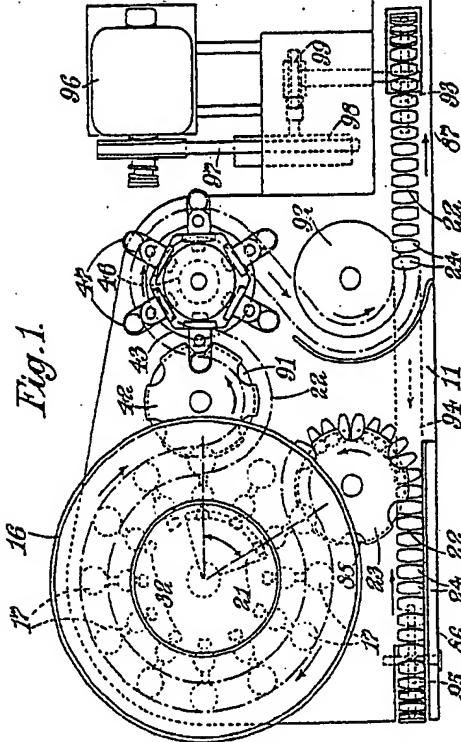


Fig. 1.

